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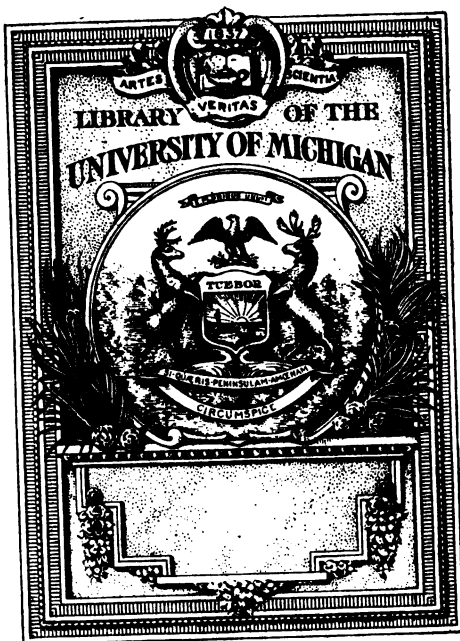
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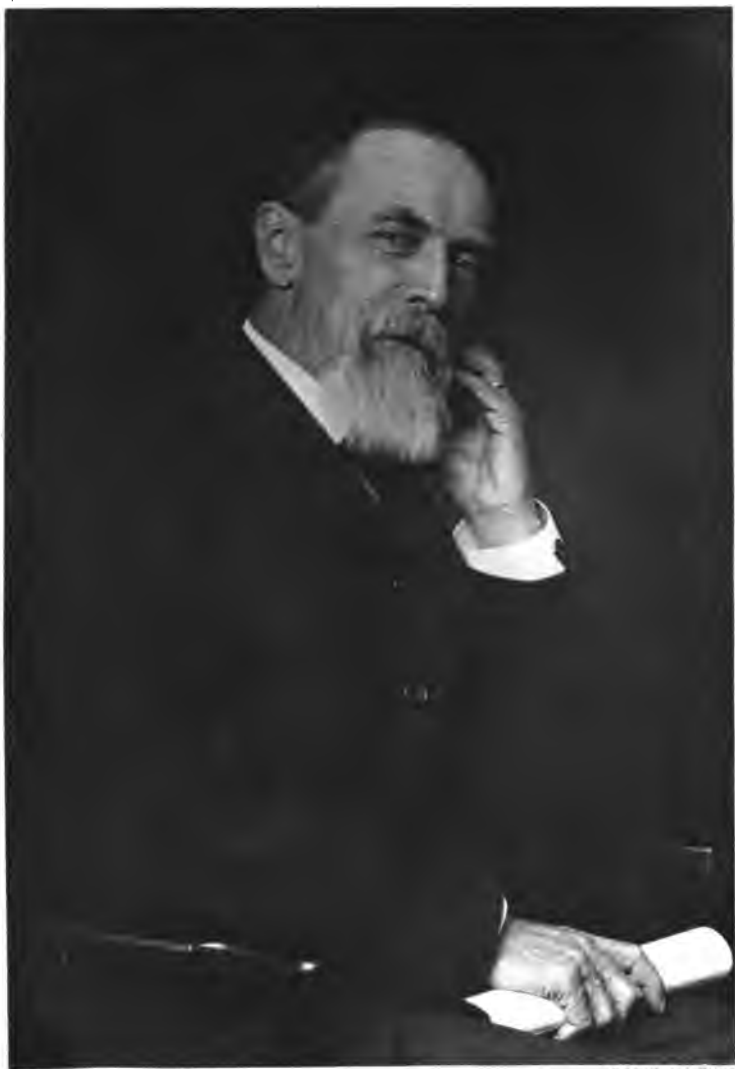
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In Memoriam

Eugene Woldemar Hilgard



Organizer of the Agricultural Department of the University of California and Founder of the University Agricultural Experiment Station, 1875; Professor of Agriculture and Director of University Experiment Stations, 1875 to 1905; Professor of Agriculture, Emeritus, 1905 to 1916. Died January 8, 1916.

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**ADDRESSES AT MEMORIAL SERVICES IN HONOR
OF DR. E. W. HILGARD, UNIVERSITY OF
CALIFORNIA, JANUARY 30, 1916**

REMARKS OF PRESIDENT BENJ. IDE WHEELER

We are met here today as a community of scholars, whose eldest brother, having finished his long toil under the conflict of day and night, has gone peacefully out into the perfect light. We are met, not to bid him farewell, but to be reminded of him, to rejoice in his triumph, to reaffirm our love toward him, and thereby to quicken with one another the spiritual bonds of our guild.

Eugene Woldemar Hilgard has kept the faith. He has lived among his fellow men in active respect for the principles of order and authority.

He has built his life into one of the most helpful institutional forms of human society. He has fulfilled the best traditions of a refined and honourable family of the Rhenish Palatinate, out of whose stock he came.

He has been a gentleman. He has been true to the best methods and standards of the science in whose fields he toiled.

He has been loyal to the best traditions and standards of academic life. He has kept the faith.

ADDRESS BY E. J. WICKSON
Professor of Horticulture, Emeritus

We are assembled today not to mourn over a life that was long and good but to be thankful for it; not to be sad that such a life was an environment of our own but to be

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glad of it; not to stand in inexpressible wonder in what remote and glorious sphere such a life is now continuing, but to lay firmer hold upon that part of it which was the endowment of our own lives, of the lives of this institution, of the State and of the world. For, without yielding aught of the claim to transcendental glories, which both true reason and revelation place in the western horizon of such a life, we may doubt or forget the remoteness of its glorification. For myself it is impossible to think that Hilgard has really departed for a far country. To me he is still here, loving and revering his God, laboring for the good of his fellowmen, enjoying the companionship of his friends and his loved ones—still here, alert and tireless in work; full of strength and grace in thought and speech; cordial, considerate and delightful in associated effort. I still think of Hilgard as many of us have known him for decades and, in this undertaking to lead you in glad admiration and remembrance of him, I shall speak of him as I used to speak to him; for we lived together through times and conditions which made it necessary to discuss frankly, not only the fundamental reasons for positions assumed, but methods of thought, attitudes, forms of expression, ways to force and ways to win approval and support from a firmament of authority which sometimes frowned and from a constituency which sometimes scowled and swore.

Through all such storms of adversity Hilgard came in due time into the full sunshine of enthusiastic approval and support, by the truth and talent which were in him, by the work that was in him and by the beautiful light of love for his fellowmen which twinkled in his eye and shone, full-orbed, in his smile. As I ask you to remember and honor him, how can I think of him as now remote; how can I think of his earthly life as over when I see that it will always continue in the activities of this institution which will live to the last day of mankind. It is therefore only one phase of an entity which will endure, of which I speak to you and, if I can speak at all truly, that phase will appear to

you unique; abounding in gladness of heart but unswerving in tenacity of purpose; unremitting in labor and never depressed or appalled by its requirements; full of learning, both old and new, and fruitful in accomplishments beyond the usual achievement of even those accounted among the most efficient of men.

A BIOGRAPHICAL OUTLINE

Eugene Woldemar Hilgard was born January 5, 1833, at Zweibrücken, in Rhenish Bavaria, the son of Theodore Erasmus and Margarethe Hilgard. His father was a lawyer, holding the position of chief justice of the court of appeals of the province. Judge Hilgard, having been born and educated under the shadow of the French Revolution, and being of pronounced liberal views, stoutly opposed the supercedence of the Code Napoleon by the illiberal laws of the old regime. In 1836, when at the fullness of a successful career, he determined to emigrate to America with his family and settled on a farm at Belleville, Illinois. As the public schools of that day were quite primitive, Judge Hilgard personally undertook the preparation of his sons for entrance to the universities. Eugene was in readiness in 1849 and in that year returned to Germany to attend the University of Heidelberg—graduating with honors and a doctor's degree in 1853. This degree was re-issued to him in 1903 as a "golden degree" in recognition of half a century's good work for science. He studied also at Zürich, and at Freiberg in Saxony. After graduating in 1853 he visited Spain and met Miss J. Alexandrina Bello, daughter of Colonel Bello of the Spanish army, whom he married several years later. Returning to America, he began geological exploration work in Mississippi in 1855 and was appointed state mineralogist of that State in 1858. In 1860 he revisited Spain, married Miss Bello and resumed his work in Mississippi in November of that year. During the intervention of the Civil War he pursued the chemical work

required by the Southern Confederacy. In 1866 he was chosen professor of chemistry in the University of Mississippi—then professor of geology, zoology and botany. In 1872 he left Mississippi to take a position on the faculty of the University of Michigan, but remained there only two years, when he was called by the Regents of the University, to California in 1874. While developing agricultural instruction in the University, he proceeded with research work immediately after his arrival in California and published his first results in 1877. His work in the investigation of soils in connection with their native vegetation, of the influence of climate on the formation of soils and especially of the nature of "alkali soils" and their reclamation, a problem quite new not only in this country but in other arid regions, achieved for him a reputation as wide as the world of science. It brought him recognition on numerous occasions. Mississippi, Columbia and Michigan universities, as well as the University of California, have bestowed the Doctor of Laws degree upon him. The Academy of Sciences of Munich presented him with the Liebig medal for distinguished achievements in the agricultural sciences and the international exposition at Paris, in 1900, gave him a gold medal as a collaborator in the same research.

Soon after coming to California he directed the agricultural division of the northern transcontinental survey. From 1879 to 1883, in connection with his university work, he assumed charge of the cotton investigation of the census of 1880 which he projected and carried out on a broader plan than ever before been undertaken. During the whole period of his academic career Professor Hilgard was constantly active in authorship. In addition to formal reports and memoirs, he wrote much for agricultural and scientific periodicals. His greatest book is *Soils of the Arid and Humid Regions*. The simpler form of this work is *Agriculture for Schools of the Pacific Slope*, undertaken in collaboration with Professor Osterhout, formerly of the University of California.

In 1892 he revisited Europe and was received with distinguished honor by his colleagues in science in the German universities and experiment stations, and by invitations to deliver public addresses on the subjects in which he had made his chief achievements.

Since 1910 Professor Hilgard's advanced age rendered him unequal to the pursuit of extensive tasks. He maintained, however, his membership in several scientific societies and was vitally interested to the last in investigations connected with his science.

Professor Hilgard met with two great bereavements during the active period of his life—the loss of an only son in 1889, and, in 1893, the loss of his wife. He is survived by two daughters, Marie Louise and Alice Hilgard, who have been to him sources of great joy and delightful companions during his declining years—giving him such care as all good fathers deserve but few perhaps receive. Professor Hilgard's home and social life were exceptionally pleasant and inspiring, and personally he endeared himself to the whole community, which gave him true love and abundant honor.

HOW HILGARD CAME TO CALIFORNIA

Instruction in agriculture in the University began briskly in 1870 with a thorough course on fruit growing in the Garden of Eden, passing spiritedly to grain growing in Egypt and the conditions surrounding the corner in sorghum which Joseph contrived for Ramses II, pausing to look carefully into the dairy practices of the Scythians, and was rapidly approaching the relatively modern cabbage growing of *Cincinnatus* when, as tradition declares, both instructor and pupils fell asleep while pursuing dry-farming by the encyclopedestrian method of teaching. A situation was created thereby, and a change in point of view of agricultural instruction in this institution was decided upon.

The historical, social, and political aspects of farming, though dear to the farmers of half a century ago because they seemed to minister directly to the advancing social dignity and political power of their occupation, were discerned by far-seeing men not to approach the fundamental needs of farming, in increasing and improving production and the greater prosperity presumably attainable through better understanding of farming materials and methods of their economic relations. It was revealed to many at that time, if not widely recognized by farmers themselves, that science could do more for farming than tradition; that the mainspring of rational farming was natural science; that the way to improve farming was to put more force into the mainspring.

This truth dawned broadly half a century ago, following the streamers of light which had for decades portended its arising. It was a world condition, but I speak only of California's share of it. The enlistment of science as an aid to agriculture was effected by an initiative within the University and not from those then most prominent in the farming industry of the State—in fact, there was some resentment that an earlier instructor who had impressed them as “practical” should be displaced in the interest of science.

From its own point of view, the University had no difficulty in deciding that Hilgard was the proper choice for Professor of Agriculture in this institution and that he was fully trained and equipped. Was he not a master in the classics and endowed with all the graces and disciplinary forces of the real learning of the world? Had he not received *summa cum laude* from the highest fountain of natural science in Germany? Was he not panoplied by the great Liebig? And had he not demonstrated his personal power in research and exposition by exalting the state of Mississippi into the first rank of states which knew their geology to the very bottom of it and had he not advanced Mississippi even beyond others of its rank by tracing its

soils to the rocks whence they came, by ice, wind and water, to the piercing by the plow? Surely all these things were true and their force fully realized by the University faculty. The professors of science of the University demanded Hilgard and the Regents elected him, counting it, from their point of view, a good business stroke, because he could not only teach agriculture but all the sciences underlying it which were not otherwise provided for in the existing faculty. Thus the older sciences held out their hands to agriculture, then the youngest of their group, and Hilgard came to the University in the winter of 1875.

HOW HILGARD BEGAN HIS WORK

Of the many and various problems which faced Hilgard at the beginning of his work in the University of California, I select three which, at this moment, seem to give the best clue to the masterfulness of the man and fullest understanding of the breadth and depth of his success:

First: the conciliation and conquest of his farming constituency, by demonstration of practical and indispensable value in the work he could do.

Second: the enforcement of recognition of agricultural studies as entitled to the dignity of higher learning and as possessed of pedagogic value.

Third: the securing of funds to pursue research, which alone could yield truth about natural conditions affecting California farming, and to increase his working force—without which he could neither get the truth nor teach it, in its several branches and applications.

To present to you even outlines of Hilgard's complete or progressive solution of these three problems would require a volume, so deep did he delve into the underlying facts and causes and so far and high did he pursue effects and influences. As I look back over the forty years of my observation of his work, I see him, arraigned before four bars of public opinion: the farming population, the faculty of the

University, the Regents of the University, and the legislature of the state, and I see him pleading soundly, patiently and successfully at all these tribunals: securing, finally, not only the consent but the enthusiastic support of all of them in the pursuit of his undertakings. Let me briefly support that declaration.

Hilgard's conciliation and conquest of his constituency was the first and the easiest of his victories. I have mentioned the resentment caused among the leaders of a farming organization by the retirement of his predecessor. It was not a personal resentment because all knew that Hilgard had neither knowledge nor participation in it, and yet any follower of a favorite must incur some opposition. This favorite whom they called "practical" was displaced by a man called "scientific"—and the word itself was hated, then, as irrationally as it has sometimes been worshiped since that time. But all such opposition to Hilgard was short-lived. There was opposition, through rivalry and self-interest, which gave him good fighting to do later, but his conquest of the early farmers' opposition was by conciliation. I clearly recall an instance of his method. I was present at a farmers' meeting in San Francisco in 1876, apparently called to see just how far the college of Agriculture had fallen. The room was not large and was crowded with men of some prominence in farming and hostile to the University because they really believed that the College of Agriculture ought to be snatched from ruinous association with a so-called "classical institution." It was a stormy assembly but when there came a lull the chairman asked Hilgard to speak. He rose alertly, showing then a slim, graceful figure, and when he had folded and pocketed the blue glasses which a long continued eye trouble forced him to wear, they saw a scholarly face illumined with an eagerness, cordiality and brightness of expression which seemed to say to them: I never was in such a delightful place before in my life. Before he could say a word he had them transfixed with surprise and curiosity, and when



he began to speak in a low, conversational voice, with an accent which compelled them to listen closely, every man was at attention. He was saying that he was glad to meet them; that no one could do much for farming unless he had personal knowledge and support of farmers; that he had listened with interest to what they had been saying and much of it doubtless would be helpful to him; that other things they could talk over and agree upon when they became better acquainted; that he had come to California to try, with their help and support, to know California, from the rocks to the sky, and proposed to use all that he had learned in other lands merely as a help to begin to know California, which he had already perceived was different from any other land in which he had lived and worked. He wished to work from California outward; not to try to fit old theories to a new state. He had always been interested in differences and wanted to see what they were and how they worked in farming. On his father's farm in Illinois he learned that the soil was not all alike and had been told that soil differed when it came from different rocks, when it was moved about in different ways and when other things were mixed with it, and since boyhood he had been studying the rocks, the soils, the plants, to see what was in the soil and in the plant in the hope of matching them up, to get the best crops and the most money in farming—and then followed a charming half-hour with soil formation and movement, tillage, fertilization, etc. etc., without a scientific term, without reference to a chemical formula—all straight farming talk about soils and plants. Finally he said he had come to find out how these things worked in California. He particularly wished to know whether California farmers had anything as hard to handle as the gumbo soil of the Mississippi Valley.

It was a master stroke and all so unconsciously delivered. Before he could regain his seat, questions were fired at him from all over the room and he answered them readily and confidently. At least half-a-dozen had soil which they

knew was many times worse than gumbo; would he come to the farm and see it? As the meeting closed after half an hour of such friendly and informal conference, a tall giant from the San Joaquin who was a leader in the opposition and who was known to be able to damn the classics all around a thousand acre grain-farm, leaned down and whispered in my ear: "My God, that man knows something!"

Such experiences were repeated scores of times in different parts of the state during the first few years of Hilgard's administration of the College of Agriculture. His purposes were approved and his personal achievements praised in ways I have not space even to suggest. A single significant token of his victory may be seen in the fact that, within five years after his coming, the State Master of the organization which set itself and its ten thousand members to the task of segregation of the College of Agriculture from the University, presented, in the constitutional convention of 1879, the article which made the organic act of the University a part of the constitution of the state and thus lifted the integrity of the institution above legislative dismemberment. This achievement was profound in its effect upon the development of this institution: it was wide-reaching, for it has proved a rock upon which efforts for dismemberment of land-grant universities in other states have been dashed to pieces.

I do not, of course, mean to intimate that Hilgard's conciliation of the farmers (and those disposed at that time to train with them in opposition) indicated that there was an adverse majority in the convention to be overcome, for the University had abundant strength to prevail. But the importance of the opposing minority is seen in the fact that those in charge of the University interests deemed it worth while that the conquered leaders in opposition should be given leadership in affirmation, and that was possible through their conciliation and satisfaction by Hilgard.

Though Hilgard's first great and enduring work was done by conciliation, do not think for a moment that he was

a pacifist. He was a warrior, bold and confident. It was a wonder to some of us, who knew him best, how a man so genial and so full of love for his fellowmen could fight so hard and mercilessly. Sometimes we thought he fought not wisely but too well. Sometimes the cause of war seemed not worth the time and the munitions. But fighting was recreation for him: it seemed to renew his strength, to deepen his convictions, to freshen his thought. My impression is that on the whole it did no harm—not even to himself. I believe that what he counted his greatest victories were won not by the fighting but by the personal sincerity, ability and capacity which he displayed while doing it, and thus victories, when he attained them for his contentions, were not by arts of war but by attributes of peace.

HILGARD'S EARLY WORK IN THE UNIVERSITY

Hilgard came to the University largely by the initiative and influence of the science branch of the faculty, as stated, and he at once took a leading part in the general effort which the sciences had to make to secure parity of pedagogical position and influence with the old culture-studies which were entrenched in the faculty, the Regents and in the professional classes which held strongly to the old educational ideals. In this effort for the fuller and fairer recognition of science in educational curricula and policy, Hilgard came as a great reinforcement to the protagonist of science, for he could not be impeached for lack of knowledge of classical point of view and materials. He knew his Latin and his Greek and the literatures of them, and only the distinguished professor of German of that day could surpass him in conversational scope in modern languages. And he loved all this learning and constantly used it familiarly, while, beyond all conscious employment of it, there it was, forming his thought, gracing his style and in every way influencing his action and enriching his life. One can readily see what an influence such a man must have been

in winning recognition for applied science from those who held ever so strongly to the old standards. Naturally the fiercest opposition came from those within academic circles—from the shrine-makers of Ephesus. Although in his first report, for the year 1877, Hilgard clearly announced the principles upon which his instruction would be developed, for years he still had difficulty in making his position understood and his fundamental principles recognized as educationally sound. In that report of 1877 he said:

“A knowledge of facts and principles and not the achievement of manual dexterity, must be the leading object of a truly useful course of instruction in agriculture.

Object teaching should be made the pre-eminent method of instruction in natural, and more especially in technical science. Manual exercise should be made the adjunct of the instruction in principles.”

Thus Hilgard announced, at the very beginning, his adoption of the laboratory and field method of instruction and he pursued it as far as he could command the outfit for it. That he was right in his choice of principle and method is attested by the present educational consensus that there is no other way; and it is being lavishly provided for now, even in branches of learning to which at that time it was not dreamed to be applicable. And yet, though he announced at that remote day his adoption of a policy which is now dominant in educational work and though he demonstrated the practicability of it with pitifully poor equipment, the opposition which he encountered would strike you as incredible even if I could present it most accurately and with faith to the spirit of it. But he went on writing, speaking and fervently praying I doubt not, as Hilgard was a godly man, for the initial recognition of educational truth which is now all pervading—contending for the recognition of agricultural science, adequately known and properly taught, as a respectable branch of higher learning and inferior to none other, in the line of pedagogic material and in its relation to preparedness for life. He made trouble

for others, of course, for he was always pushing, prying and crying out for the attainment of what he saw to be educationally true and good for mankind. But no opposition daunted him. When a distinguished logician declared once that agriculture was only handicraft and should have no place in University instruction, his comment was in kind, and to the effect that speculative philosophy never arrived: it was mental gymnastics—always indulged in with the danger of being thrown from the parallel bars of knowledge and faith and breaking one's spiritual neck. But such a comment under stress was not an indication of Hilgard's habitual attitude toward other branches of learning. He was not only charitable and tolerant but he was genuinely interested and fair. However, to be told that agriculture was only handicraft was a serious affront to a man who had lighted his torch at the fires of Liebig and went forth to declare and to demonstrate that agriculture is the greatest of the natural sciences because it requires the fullest work of all of them to reach its own greatest development.

The stand taken by Hilgard with reference to the dignity and pedagogical value of agricultural science, while so many institutions, now great, were in their formative periods, was recognized as sound throughout this country and beyond. Set forth in his early reports it exercised a profound influence. The proper relation of agricultural practice to agricultural science, as factors in educational effort; the educational distinction between labor performed for enlightenment and labor prescribed to beget a liking for labor; the place of both the art and science of agriculture in a University of higher learning, when both are handled ably for instructional purpose—these were among his fundamental contentions, upholding them through many controversies, and his victory is seen in their entry into the regular curricula of all of the newer institutions of learning and their pursuit by older institutions established upon other standards of learning before the existence of them as educa-

tional factors was dreamed of as worthy and capable.

Even the vocational point of view, now so universally prevalent, was clearly occupied in his first report, that of 1877, and the first accession to his staff was an instructor in practical agriculture in 1878. Thus, at the first opportunity, he justified his conception of the relation of facts and principles, when the natural temptation was to exalt his own personal line of research by proper laboratory provision and equipment. But Hilgard was always broader than his own science. He was a real man and a true educational philosopher.

HILGARD'S CREATION OF AGRICULTURAL RESEARCH IN CALIFORNIA

But great as were Hilgard's services to educational science and policy, it is probable that his achievement and influence in agricultural research in the United States will be counted greater. Even if we disregard the incalculable value in his assumption of the agricultural point of view in connection with his geological work in Mississippi and count his services from his beginning in California, he still stands as the founder of American institutional research in agriculture, including both laboratory and field work. However, as often happens in science, priority can be claimed only by a narrow margin. Fortunately Hilgard opened his laboratory in the spring of 1875 and began an experiment to determine effects of deep and shallow plowing at the same time, and his rival for priority, Professor Atwater of Connecticut, was plowing his legislature at that date, reaped a law in July and opened his laboratory in October, 1875, after Hilgard had his field in fallow. His priority is "not so deep as a well nor so wide as a church door but 'tis enough." The price of that priority seems almost pitiful now. In his report of 1877 Hilgard writes: "The appropriation of \$250 for the beginning of an experiment station has, under advice, been carefully husbanded by me, after the failure of the appropriations asked of the last

legislature, in order to insure the continuation of the home work." It is not hard to understand what the words "under advice" really mean. The fact was that Hilgard was told that he could get no more money from the Regents. He must get it from the legislature, the next session of which was two years away. No wonder he "carefully husbanded" his \$250, for surely it would not pay for much experimental husbandry. Fortunately the legislature of 1877 gave him \$5000 for two years and the legislature of 1879 gave \$5000 a year for two years, of which he says, in his report for 1880, "it barely enables us to pay running expenses and farther improvement and increase of scope will be impossible"—for he then had half a dozen field and laboratory assistants to provide for.

The insistent demand of Hilgard for money to carry on his work produced at least two effects.

1. The farmers began to ask pointedly where all the money went which was provided by Congress (through sale of public lands) to conduct an agricultural college such as Hilgard wanted and such as the farmers approved. They liked Hilgard but they hated taxes.

2. The Regents began to wonder whether in the conquest of Hilgard they had not caught a man of Tartaric ancestry. As one of them is reported to have said, "they wondered what was the matter with that man Hilgard: why could he not draw his salary and not make so much trouble about money?" Some of them were quite sure they had embosomed a viper: they would quietly look into the matter. Through a functionary of the secretary's office, whom a regent or two had asked to expert the situation a little, they were told that "Hilgard spent most of his time at home mending his harness." To understand the reference one must remember that, at that day, each professor had to keep a horse and chaise to pull him through the bottomless Berkeley streets and harness-mending was indispensable. But the amateur detective made only one mistake, Hilgard did spend most of his time at home "mending his

harness" but it was not for his horse. It was for himself—the harness which he needed to pull through original scientific achievement to results which would establish his standing, with the people and the Regents, and secure the means necessary to properly develop agriculture in the University. Meantime, he fully discharged his University duties and, in addition, held the farming population not only from outbreak but in support, as already cited in connection with the incident of the new constitution of 1879.

As I look back upon it, it seems to me that Hilgard's strategic diversion of 1879 to 1883 was one of the brightest and most effective movements of his career. On the basis of his work in Mississippi he was requested by the Director of the Census of 1880 to take full charge of the cotton investigation for that census and to do something greater for the cotton industry than was ever done before; and he was promised funds for inquiry, investigation, laboratory work and whatever else he deemed necessary to get at the fundamental facts and principles connected with cotton growing in the United States. Hilgard seized what he recognized as exceptional opportunity to demonstrate his power. He selected assistants and set them at work studying cotton-producing conditions from the soil to the sky and their influence on quantity, quality for various purposes, cultural methods, etc. He reviewed the subject as a whole and in divisions; studied each cotton state and finally produced two volumes illuminated with plates and maps, bristling with tables of analyses, statistics of production and, running through it all, edifying and inviting text. I need not try to characterize it as a whole except to say that the report as printed weighs over ten pounds—every ounce of which was made in California and is emblazoned with the insignia of the University of California, but it cost the state and the University not a cent. More than that, California was presented as a "cotton state" and her natural conditions were so thoroughly studied and so ably set forth that a part of that work entitled "The Physical

Features of California" is cited and quoted to this day by those who desire to demonstrate fundamental things about the state. While his local patrons and employers were wondering how Hilgard could use \$2500 for expense money, the United States gave him not less than \$25,000 to spend in his cotton work—one wide-reaching result of which was that it made California famous.

Yes, the amateur detective was literally correct: "Hilgard was spending most of his time at home mending his harness." And what a powerful harness he made of it! It pulled him away from all doubt of the scientific quality and the industrial value of his work in the development of California. It made it easier to get appropriation for all kinds of research work: it made it easier for the University as a whole to get funds for its general purposes. Not that Hilgard nor the University was able to get as much as they needed to realize their beneficent purposes. Good research men and good institutions never did get as much as they need and probably they never will. Perhaps, if they should, they might cease to be good.

But this monumental cotton work, based upon the soil work which was one of its foundation walls, was nation-wide in its influences. It was accepted throughout the country as a demonstration that Hilgard could do the work which his California reports and other publications were urging upon the public mind. It was a force in engrafting original research upon the instructional work, established through the educational land-grant law of Morrill, by the enactment of the Hatch law for experiment stations in all states; and when those institutions were being developed in the latter '80's Hilgard and the research establishment which he had created in California were the accepted prototypes of men, means and methods.

Nor was he simply a national exemplar in his line. When he went abroad for a short year in 1892, after seventeen years of tireless and most productive work in California, he was received with unusual tokens of honor and

esteem, and by many learned scientific bodies was prevailed upon to describe his ways of work and the notable differences, which he was first to formulate, of conditions in arid and humid climates in their scientific and economic aspects.

Hilgard resumed his work in the University in 1893—sooner than the regulations required because he could not longer restrain himself from his usual work. For more than a decade after his return he applied himself with his customary vigor, insight and success, upon undertakings which were growing by leaps and bounds because he had started and directed them aright. His last years of administration were his best years: his position of leadership was unquestioned; his physical strength seemed greater than during some of his earlier periods; the demands for instruction and the opportunities for research were multiplied. He labored like one who was realizing the results he had long desired and his heart was light as his time for greatest achievement had come. In the fullest warmth of popular appreciation and with the truest loyalty and devotion from the scores of associates whom he had chosen for particular purposes, he did his best work for agriculture in the University by making the greatness of its future secure.

Thus, friends and admirers of Hilgard, have I tried to give you simply a few glances at the life which you honor and for which you are thankful. I have chosen to dwell upon remoter phases of his activity because only a few share with me the deep joy of having been with him then. I do not try to measure his achievements in science or technology, nor even to indicate them. It seems to me that we think first of the man, of the purpose that was in him and of the development of that purpose under his environment. Phases of that development which were precedent to your own periods of observation, therefore, have seemed most fitting to present. And yet I may say, confident of your approval, that the results of Hilgard's labors are in the warp of California's first half-century of intellectual and industrial life and upon such enduring work as he achieved

will be spread the splendid fabric of the coming advancement and development of our state. He was quick to see his opportunities of public service, to recognize his duty therein and he was masterful and tireless in pursuit of it. He was bold in conquest of truth and fearless in his use of it for the interest of mankind—seizing gladly the smallest fact from research and pressing it to the humblest service but always perceiving and enforcing the relations of both the fact and the service to the broadest interests of his state and of his fellowmen. Thus all came to know him as richly wise, unswervingly true and deeply patriotic and humanistic—a man whose thinking was as clear and whose motives were as unselfish as his service of them was forceful and effective. His achievements were great and diverse and his honors therefore great and widely bestowed.

California has lost a citizen of great achievement and influence, whose monument will be the greatness of his work for California which can never be forgotten because it was so great, so everlastingly sound and true and so closely related to the happiness and prosperity of his fellow-citizens and of all who shall come after him. It is most fortunate that he was allowed to approach as near as man ever comes to the completion of his work, and to enjoy the realization of remarkable public advancement along lines which he clearly discerned, forcibly marked out and labored to deeply impress upon this great institution, of whose history his life and accomplishments will always be recognized as an integral part.

THE LIFE-WORK OF PROFESSOR HILGARD

R. H. LOUGHRIDGE

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Eugene Woldemar Hilgard, the “grand old man” of agricultural science, the youngest of nine children, developed a love for the natural sciences in his boyhood days on his father’s farm near Belleville, Illinois. He received

instruction in mathematics and the languages from his father, his home library giving ample opportunity for reading and study, found time from his farm work for riding and hunting, botanizing and insect collecting, and during a period of ill-health from malaria, read works on chemistry and botany. At the age of sixteen his eyes failed and for a change he was sent to Washington, D. C., to visit his brother Julius, then assistant in the U. S. Coast Survey. Attending lectures on chemistry in the Homeopathic Medical college and the Franklin Institute of Philadelphia, he soon became lecture assistant in the former. In 1849 he went to Germany and entered the University of Heidelberg, but on account of political troubles then existing, went to the University of Zürich, completed his studies in mining and metallurgy in the royal mining school of Freiberg, and later returned to Heidelberg, where he graduated in 1853, with the degree of Ph.D., at the age of twenty. In his graduating thesis he was the first to distinguish and define the four parts of the candle flame and the processes occurring in each. While a student his early desire for investigation and research manifested itself in an experiment on himself with a poisonous dose of arsenic to ascertain its effects; it is needless to say that at the critical moment he took the antidote.

He had intended making the practice of medicine his life profession, but after a two-year course of lectures gave up the plan, as he felt that he could not have human life entrusted to his skill and dependent upon the uncertainties of his correct diagnosis and prescription. He then turned to chemistry, geology and botany as giving a broader, more accurate and more interesting field for investigation and research.

On account of continued ill-health, he went to the coast of Spain and spent two years interesting himself in geological observations. He was an intense lover of music and this happily brought him an introduction to Miss J. Alexandrina Bello, daughter of Colonel Bello, of Madrid, who in

1860 became his wife. In 1855 he returned to Washington, D. C., and fitted up a small chemical laboratory in the Smithsonian Institution, but very soon accepted the position of assistant state geologist of Mississippi. Thus at the age of twenty-two years, well trained in the natural sciences especially chemistry, geology, botany, and physics, with a keen mind, quick and accurate in his observations, and with a remarkable memory, he began his life's work and entered upon the survey with enthusiasm, although the field seemed very unpromising from a geologist's standpoint. With a traveling outfit consisting of an old ambulance, two mules, and a negro driver, who also was the cook, he explored portions of the state, making observations and collecting material for study. In 1857 the survey was suspended by the legislature, and Hilgard returned to Washington as chemist in the laboratory of the Smithsonian Institution and lecturer on chemistry in the National Medical College.

In 1858 he was appointed state geologist of Mississippi by the governor and resumed his detailed investigations on the geology, botany, agriculture, and other economic features of the state. He found, however, that he had strong opposition in the legislature and among the farmers which must be overcome. To do this he wrote his first report to the governor on the condition of the survey, and placed on exhibition at the State Fair a collection of soils and marls which he used in explaining to legislators and farmers the objects of the survey and its importance to them and to the state. From his previous investigations he was enabled to advise regarding soil peculiarities and needs, and thus won the confidence and support of the masses. Hilgard thus in the very beginning of his great career passed through his "baptism of fire" with law-makers and the always suspicious farmer, and showed that same ability, skill, determination and personal magnetism that afterward characterized his numerous fights for what he believed to be right and necessary for the cause of agriculture.

One of the chief characteristics in Hilgard's nature was the extreme care, accuracy and attention to detail that he gave to everything that he undertook, and this is strongly shown in the results of the Mississippi survey, which combined observations on the geology, botany and soils of the state. His field notes taken on his trips have been preserved and are interesting reading.

In his movements from place to place in search of geological outcrops he was quick to note the sharply outlined differences in the native tree and plant growth on the several types of soil, and especially the differences in behavior and durability of soils under continued cultivation. He became deeply interested in these observations and determined to make them the subject of special study, realizing that the farmers themselves should secure some benefit from the survey. Mississippi seems to have been especially favorable for such observations, for it was very largely covered with a growth of native timber and had a great variety of soils, from the poor sandy long-leaf pine lands of the coast region, the richer loams and black clays of the interior, to the calcareous lands of the bluff region and the remarkably rich alluvial lands of the river. Thus were begun those studies of the chemical, physical and other properties of soils that became his life work and which, extending to others states and countries, have brought him honors and renown over the entire civilized world.

One of his interesting and valuable observations, and one that aided him greatly in his geological work, was that a change in tree growth was an index to changes in geological formations and thus served as a guide to outlines of the latter.

The state university fitted up for him a small chemical laboratory where he made analyses of soils, marls, etc., and here, as he told the writer, he worked all day and far into the night, using one hand in chemical analysis and the other in writing his report, as it was imperative that he

should complete the latter and visit Spain. In 1860 was finished and printed his report on the geology and agriculture of Mississippi, an octavo volume of 391 pages in which were given in detail his observations on the geological formations and agricultural features with many chemical analyses of the important soils. This work is still regarded as a standard authority on the geological formations and soils of Mississippi and the southwest. A geological and agricultural map accompanied the report.

- During the Civil War the exercises of the University were suspended, and Hilgard as state geologist was placed in charge of the library and equipment by the governor and thus escaped service in the army. He was appointed an agent of the Confederate "Nitrate Bureau," and at the siege of Vicksburg was ordered to erect calcium lights on the bluffs for the illumination of the Federal gunboats in their attempt to pass the city. The fleet, however, passed before he could complete the arrangements for adequate light.

When the University was reorganized in 1866, he was elected Professor of Chemistry, which title was changed to that of Professor of Experimental and Agricultural Chemistry in 1871. (It was the writer's good fortune this early to have become a member of his first class, in which a mutual friendship and loyalty began that continued up to the time of his death, a period of fifty years.) In the laboratory he continued his studies into the chemical and physical properties of soils in their relation to crop production, and established a small farm for culture experiments.

Although he relinquished the position of state geologist to another, he continued his interest in the further study of the geology of Mississippi and other southern states, or as he termed it "The Mississippi Embayment." In 1867, at the request of the Smithsonian Institution, he made an examination of the Mississippi river delta, the rock-salt deposit of Petit Anse Island, Louisiana, and the cause of the formation of the great mudlumps that rise

in the Passes near the mouths of the river and greatly interfere with navigation. He later made a geological reconnaissance of Louisiana for the New Orleans Academy of Sciences.

Professor Hilgard, in Mississippi as afterward in California, was always full of energy and activity in and out of the laboratory, working in the interest of the University, the state and especially the farmers; with the latter he was in close touch, advising and aiding them as far as possible in their difficulties, and he was regarded by them as a true friend. He was the first to analyze the cotton lint, oil, hulls and seed cake and to point out the loss which the farmer sustained by his habit of putting the whole seed on the land instead of having its valuable oil (which has no fertilizing value) expressed and sold and the cake alone used as a fertilizer. Professor Hilgard displayed quite an inventive genius in the laboratory, as was shown in his elutriator which he designed and made in the Mississippi laboratory for the mechanical separation of soil particles. In it the flocculation or coherence of the particles suspended in the water column was prevented by a stirrer, the motive power being the works of an old clock to which was attached great weights which had to be wound up every morning by a strong negro janitor; water or electric motors were not to be had in those days.

In 1873 Professor Hilgard accepted the professorship of Geology and Natural History in the University of Michigan, but found no opportunity for research work in his favorite soil studies. While his associations there were delightful, he evidently longed to get in touch again with soil crucibles, beakers, funnels, soil solutions, and soil problems, for when, in 1874, the Regents of the University of California asked him to deliver a course of lectures and to accept the position of Professor of Agriculture in that institution, he visited the state and gave the lectures; and seeing in California a more congenial climate and a



Portrait of Professor Hilgard in 1874,
while at the University of Michigan

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splendid opportunity for new achievements in a new field of study, he consented to accept the position, and came to Berkeley early in 1875. He thus entered upon the field of his greatest activity in soil investigation, though greatly handicapped at the beginning by lack of facilities and by absence of interest in the department on the part of farmers and students, as well as by a spirit of "Do sit still, draw your salary and say nothing" on the part of those who should have come to his support. He protested against inactivity, and by the exercise of the same tact and perseverance and by the influence of his own enthusiasm and personal magnetism that won for him in Mississippi in 1858, he broke up the apparent indifference; a class consisting of Messrs. Christy, Edwards, Slate, and Soulé (each of whom afterward became a member of the University faculty) was recruited from other departments, and formed his first California class in agriculture; he also had a class in botany. A small tract of land was given him on which was established, in 1875, the first experiment station in the United States.

By correspondence and by visits to farmers' granges and meetings of farmers where he talked to them freely on farm topics, and by his readiness to respond to calls for information, he won their confidence and secured their co-operation in his work; and thus forty years ago he laid the foundation for the College of Agriculture that now in usefulness and in the scope of its activities is second to none in the United States.

During the thirty years in which he was director of the station he was constantly in receipt of inquiries on all subjects, not only from farmers, but from persons of other professions and even of no profession at all. He was, however, possessed of a remarkable store of information and was always ready to give freely of it to any one, as is shown by the forty or more letter books in which are preserved copies of upwards of 20,000 letters written by him

in reply to such inquiries. His replies were always in full, and these forty volumes have a wealth of valuable information stored between the covers.

Prior to 1890 he established several outlying substations for the study of soil and culture problems peculiar to the several agricultural divisions of the state which are marked largely by differences in climatic conditions. The most important of these was the one at Tulare in the San Joaquin Valley, established for the purpose of studying alkali problems, in which he took special interest and pride.

Among his California activities there stands out prominently his studies on humid and arid soils, in which he was the first to point out their differences in depth and in physical and chemical characteristics; he was the first to explain endurance of drouth by culture crops in arid soils and why sandy soils are among the most productive in the arid region and the least so in the humid. He was interested not only in the soils of the United States, but in those of foreign countries and was constantly on the alert for new data.

His successful researches into the cause and occurrence of alkali salts, their effect on vegetation and especially the methods to be used in their neutralization and the reclamation of the land in which they occur, are well known. He was the first to enter this field and the results of his experiments have been extensively quoted and his bulletins published in other countries where alkali lands exist.

His report on cotton production in the United States made for the Tenth United States Census at the request of General Francis A. Walker, Superintendent, is also a valuable contribution to soil literature, comprising as it does a description of the geology, topography, climate, soil regions and soils of each of the cotton-producing states, (including California), as a whole and by counties, also methods of cotton culture, cotton-seed industries, cotton-fibre measurements, etc. Professor Hilgard had the direc-

tion of the whole work and wrote the general part and the special descriptions of Mississippi, Louisiana and California; those of Alabama and Florida were written by Dr. E. A. Smith; Virginia and North Carolina by Professor W. C. Kerr; South Carolina by Mr. Harry Hammond; Tennessee and Kentucky by Dr. J. M. Safford; and Georgia, Texas, Arkansas, Indian Territory, and Missouri, by Dr. R. H. Loughridge. Each report was accompanied with colored maps, and by many chemical analyses of soils with discussion of results.

While Professor Hilgard was not the first to make a soil survey or a chemical analysis of the soil, he was the first to interpret the results of analyses in their relation to plant life and productiveness. He was also the first to maintain that the physical properties of a soil are equal in importance to the chemical in determining the cultural value.

In an unpublished manuscript he says: "Soils are, generally speaking, the most complex materials commonly coming under investigation, and the most difficult to interpret in the relations with vegetation; the latter being, in the end, the final result aimed at. Soil study claiming completeness necessarily involves not only the chemical and physical examination of the material, but also its geological nature, position and derivation; the latter implying the determination of its mineralogical components not only for the sake of indications of its derivation, but also its probable general chemical nature. Moreover, the observer will most commonly find all changes of soil worthy of being shown on the map, indicated by corresponding changes in the character of the native vegetation; and the latter, being the result of secular coadaptation of soils and plants, will when properly interpreted render most important service in indicating certain peculiarities, both physical and chemical, which have a very direct bearing upon the cultural character and value of the lands under investigation. It need hardly be said that all

cultural experience actually had on similar land should be gathered and recorded as a specially important part of the information sought in soil survey."

Professor Hilgard tried for many years to secure funds to prosecute a soil survey of California, and his failure was a great disappointment. From information obtained through numerous short trips, from Farmers' Institutes, and from other sources a large map was prepared, showing in colors the chief agricultural regions of the state, thus excellently fulfilling its purpose; it was placed on exhibition at the Paris, Chicago and St. Louis expositions.

In the summers of 1881-83, he conducted the agricultural division of the northern transcontinental survey in the state of Washington.

The mind and hand of Professor Hilgard were never idle and, while engaged in solving old problems in relation to soil fertility and plant life, he was ever on the alert for new ones. The results of his activity are shown in the hundreds of published articles in the experiment station reports, outside journals both foreign and domestic, government publications, etc. In 1906 he published his large work on *Soils*, comprising about 600 pages, and regarded by him as a summary of his life-work on arid and humid soils. But after its publication he often wished for an opportunity to revise it and to make corrections and additions. Even as it is, it may well be regarded as the highest authority on soils of the humid and arid regions. In 1910 he published with Professor Osterhout a small work *Agriculture for Schools of the Pacific Slope*.

In 1904 he resigned the directorship of the Experiment Station and was retired from active service, as Emeritus Professor of Agriculture.

His broad and thorough scientific knowledge, his great work on soils and his valuable publications brought him not only a world-wide fame, but many honors, among them the degree of LL.D. from the universities of Mississippi, Michigan, Columbia and California, the Liebig gold medal

from the Academy of Sciences, Munich, Bavaria, "for important advances in agricultural science," other gold medals from the Expositions at Paris, Rio de Janeiro, and St. Louis, membership in several scientific societies, among them the National Academy of Sciences, and the American Association for the Advancement of Science in which he was made a life member just before his death. In 1883 he received the offer of Assistant Secretary of Agriculture from President Harrison, and leave of absence was granted by the Board of Regents of the University, but much to his regret, health conditions compelled him to decline it. In 1903, the fiftieth year after graduation, he received from the University of Heidelberg the semi-centennial diploma re-conferring the degree of Ph.D. in recognition of distinguished services in the sciences of geology and agriculture. Only one graduate besides himself has ever received this signal honor.

Professor Hilgard was quite a linguist and could converse fluently in German, Spanish, English, and French; he could also easily read Sanscrit, Italian, Greek, Latin, and Portuguese.

Although much reduced in vitality during the last three years of his life as the result of an injury, his interest and desire for serving in the cause of agriculture were keen and virile, and his great regret, daily expressed to the last, lay in his inability to pursue farther his studies of soil and other problems.

HILGARD'S GEOLOGICAL WORK IN MISSISSIPPI

EUGENE A. SMITH

Professor of Geology in the University of Alabama
and State Geologist

In 1855 the position of assistant geologist of Mississippi was offered to Eugene W. Hilgard, then just returned from a European university (Heidelberg) and thus began the career of the most distinguished worker in Gulf Coastal

Plain Geology. It is worth recording that Doctor Hilgard accepted this position amid the sincere condolences of his scientific friends on his assignment to so uninteresting a field, where the Paleozoic formations (then occupying almost exclusively the minds of American geologists) were unrepresented.

The fame which Hilgard won for himself in this "uninteresting" field is known to all geologists. He laid the foundation on which most subsequent work in the "Mississippi Embayment," as he had named it, securely rests, and after the lapse of more than fifty years since the publication in 1860 of his report his work is appreciated and referred to as authoritative, not only by the farmers and other citizens of that state, but by the geologists who have succeeded him. He became state geologist early in 1858, which position he held at least nominally until 1872 with the exception of a few years between 1866 and 1870.

From the beginning of his connection with the State Survey Hilgard saw that it could never maintain itself in the public esteem on the basis of mineral discoveries alone, and that it must seek its main support in what services it might render to agriculture. He accordingly made a point of paying particular attention to the surface features—vegetation, soils, water-supply, and marls. In the prosecution of these studies the close connection between the surface vegetation and the underlying formations became so striking that he was largely able to avail himself of this vegetation in tracing out the limits of adjacent formations and in searching for outcrops.

In the 1860 report, about evenly divided between agriculture and geology, chemical analyses of typical soils of the several agricultural regions are given along with discussions of their cultural value as indicated by these analyses considered in connection with the native vegetation. The geological half of the report presents the geology of Mississippi practically as it is known at the present day, except as to the fixing of the age of the Port Hudson beds, the in-

vestigation of the geology of the Mississippi bottom and the tracing of the Lower Claiborne formation westward to the border of this bottom. In 1867, under the auspices of the Smithsonian Institution, and in 1869, under the auspices of the New Orleans Academy of Sciences, opportunity was given to Doctor Hilgard to extend his researches down the Mississippi River to the Passes and through Louisiana. The results of these expeditions may be summarized as follows:

1. The outlining of the Mississippi Embayment in Louisiana and Mississippi.
2. The outline geological study and mapping of those two states, Hilgard was the first to give a clear and definite account of the origin and distribution of the surface formation which he called Orange Sand but which later by agreement has received the name of Lafayette. So also he was the first to give a definite account of the great series of river and estuarine deposits, the Grand Gulf, representing, as he claimed, all geological time between the Vicksburg and the Lafayette.
3. The recognition of the Cretaceous Ridge or backbone of Louisiana, and the determination of the Cretaceous age of the rock-salt and sulphur deposits of Calcasieu parish.
4. Study of the exceptional features of the Lower Mississippi delta and of the mudlumps and their origin, and the definite correlation of the Port Hudson formation.

Probably no work has done more for the correlation of the scattered accounts of the geology of the Southern States than the Cotton Culture reports of the Tenth Census (1880) prepared under the direction of Doctor Hilgard. Besides having general direction of the whole and preparing the general discussions of cotton production in the United States, including soil investigations, the cotton-seed industries, and measurements of cotton fibres, Doctor Hilgard wrote the special description of Mississippi, Louisiana, and California.

In these reports a summary of the physical and geo-

logical features of each state is first given. Then follow accounts of the agricultural features and capabilities of the Cotton States, such as should be of interest to immigrants and investors, along with special descriptions of each county, with soil maps and maps showing the relation between the areas cultivated in cotton and the total area of each state.

In a recent letter Doctor Hilgard comments on these reports as follows: "The Census Cotton Report, for all the hard work it cost, has found little appreciation because of the medium of publication, quarto at that. Don't let us do it again." But all was not lost in the quarto volumes, for in Alabama and South Carolina at least the Cotton Culture Reports were republished as State Geological Survey Reports, and have been very thoroughly appreciated and have furnished the meat for numerous subsequent handbooks.

Personally Doctor Hilgard was one of the most lovable of men. His extraordinary fund of general as well as of special information, along with his cheerfulness and vivacity, notwithstanding the handicap of a rather frail constitution, made him a delightful companion, and his letters, even on technical or scientific matters, were always enlivened by humorous and witty remarks, so that they were truly good reading.

DR. E. W. HILGARD

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Office of Experiment Stations.

The death of Dr. E. W. Hilgard, of California, closes a notable career of service to agriculture, both in length and in accomplishment. It marks the passing of the last of the earlier group of pioneers in agricultural education and research. The work he did dealt with the very fundamentals

of agricultural advancement, at a period when men see the needs less clearly and few were qualified to carry the work forward. Gauged by the time and opportunity, it will remain a great work. Who shall attempt to measure the result of it, or the influence of the high standards he set?

It is the habit to pay tribute to men of greatness after their work is closed and they are no longer able to read such words of praise. It seems far better to recognize a man's service while he is doing it, and to give him the sense of appreciation. Happily the world did not wait until retirement or death to honor Dr. Hilgard. Reward came in his active years, in a worldwide recognition and esteem which gave him an undisputed place among the leaders, and in the realization of his vision of the place of agriculture in the university and the State.

Three universities conferred the degree of doctor of laws upon him; the University of Heidelberg, where he studied, reissued the doctor's degree to him in 1903 as a "golden degree," in recognition of a half century's work for science; and the Academy of Sciences of Munich presented him with the Liebig medal for distinguished achievements in agricultural science. These academic honors reflect the high esteem in which he was held as a man of science. In his State and in his university he was honored and revered, and among the representatives of agricultural research and education he was long accorded a foremost place.

These were the rewards of a life work which had been done under many difficulties and discouragements. Backwardness in recognizing our agricultural institutions made financial support meager and opportunity and encouragement correspondingly limited. But in some way he found time and means to carry forward his investigation, and thus help to lay broad and deep the foundation for agricultural teaching. It was here that his service was most noteworthy. His later years were gladdened by the new order, which placed agriculture in a high position in the

university and in the life of the people. This gave to his life a rich measure of fulfillment.

A short review of Dr. Hilgard's career and its principal lines of activity was given in these pages at the time of his retirement from active service in 1909. In this the attempt was made to bring out the prominent features of his varied service and the chief lines in which his greatest accomplishments had been made. Since that time, although laboratory facilities were open to him, his health had not permitted very active participation in research and the contributions from his pen had been small. With clear mind but waning physical strength he gradually resigned his work to the new regime, realizing that while unfinished plans remained, in an unusual degree his part had been completed.

From the facts of his life it is interesting to note that he was born at Zweibrucken, in Rheinisch Bavaria, January 5, 1833, and was brought to this country by his parents when only three years old, the family settling at Belleville, in southern Illinois. There young Hilgard grew up, attended the public schools, and worked on his father's farm. After graduation from the high school he was sent to the University of Heidelberg, where he pursued studies in chemistry and geology especially, and received his degree of doctor of philosophy in 1853.

Returning to this country, he became chemist in 1855 of the newly established Smithsonian Institution at Washington, but soon resigned to accept a position in Mississippi, and from 1858 to 1872 his work was largely in the field of geology. In that period began his working upon soils—the maintenance of fertility, interpretation of soil analysis, etc. He went to the University of Michigan in 1872 and was called from there to the University of California in 1875.

The California College of Agriculture, though considered the real nucleus of the state university, was then in an undeveloped state, and upon Professor Hilgard fell the task of giving it form and plan, and gradually building for

it a confidence and support which made possible its later advancement to a position among the leading institutions of its kind. As a recent writer has well said: "The results of his labors are the warp of California's first half century of intellectual and industrial life, and upon such enduring work as he achieved will be spread the splendid fabric of our coming state advancement and development."

Outside of his university duties Dr. Hilgard found time for much important work. He was in charge of the agricultural division of the Northern Transcontinental Survey, 1881-1883, and as chairman of a commission appointed by the U. S. Commissioner of Agriculture on the agriculture of the arid regions he edited a report which dealt with the climate and agricultural features and the agricultural practice and needs of the arid regions of the Pacific Slope. He conducted an extensive investigation of the soils of the cotton-growing states, in connection with the report on cotton productions, with which he was charged under the tenth census.

His writings were extensive and his reports were widely sought, for they were alive with the results of new work and constructive reasoning. He saw beyond his work, and with clear purpose and keen perception he advanced the boundaries of knowledge and clarified the field in what had hitherto proved a most difficult field of inquiry. In characterizing his qualities as an investigator, the *Pacific Rural Press* says: "He possessed notably the creative faculty in thought. He was quick to see his opportunities for public service, to recognize his duty therein, and he was masterful and tireless in pursuit of it. He was bold in his conquest of truth and fearless in his use of it for the interest of mankind. His great undertaking was in natural science and its relations to agriculture, seizing gladly the foremost fact from research and pressing it to the humblest service, but always preserving and enforcing the relations of both the fact and the service to the broadest interests of his State and of his fellowmen."

Beyond this, he was "unswervingly true and deeply patriotic and humanistic—a man whose thinking was clear and whose motives were as unselfish as his service of them was forceful and effective."

It may not be generally known that Dr. Hilgard was at one time invited to accept the appointment of U. S. Commissioner of Agriculture and later the Secretaryship, but his distaste for administrative details on so large a scale led him to decline acceptance. He preferred at that stage to remain in the service of the State and the institution to which he had given the best part of his active life. The necessity for guarding his health in recent years cut him off from travel and from participation to any large degree in the activities of scientific societies and similar bodies, whose work he followed with deep interest.

Personally, Dr. Hilgard was a kindly man, gentle, sympathetic, looking for the best in others as he gave of the best in himself. His bright genial nature and his unfailing courtesy gave him a wide circle of warm friends, and he won the loyalty and affection of those who came in close association with him. In the highest and best sense he exemplified the scholar, but his humanity was never lost in his scholarship.

Strong, forceful, with a zealous love for truth, he made a very definite contribution to his generation, and he left a name which will long be revered.

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